

hemorrhage has taken place, to a considerable extent, and evidently from a vessel of large calibre, it never recurs. Many most striking instances of this have come under my notice. But though more than even this is true, and that frequently blood thrown out repeatedly is spontaneously arrested, still the great preponderance of cases in which it recurs in dangerous repetitions and quantities, as in the above instance, should cause us, I believe, to interfere on its second appearance, if it be in any quantity more particularly, and that we should not delay, so as to run the risk of such a return as will cause exhaustion. Not to interfere unless the vessel is bleeding, must not always be understood too literally, or we will often be prevented from performing a necessary operation till our patient is beyond our help. The hemorrhage recurs over and over again, and the surgeon, though as near as is practicable, arrives only in time to see the bed drenched, and the patient and attendant intensely alarmed. There is at the moment no bleeding, and he vainly hopes there will be no return; and so on goes the game between ebbing life and approaching death, the loss not great at each time, but mighty in its sum, till all assistance is useless.

The use of acetate of lead, or gallic acid, though often trusted to in these hemorrhages, are surgical farces—mesmeric passes along the vessels would be of infinitely more service.—*Edinburgh Medical Journal*, May, 1856.

17. *Escape of Great Vessels by their Elasticity, from Balls.* By G. H. B. MACLEOD.—There is no circumstance in gunshot wounds which is more striking than the wonderful way in which the great vessels, by their elasticity, escape from the ball in its transit. Thus bullets innocuously traversed parts where one would suppose a pin's head could not be placed, without wounding a vessel. True, the fact that such cases remain to be seen, results from the vessel not having been opened, and we do not know in how many cases the result was not so fortunate, but still, viewed merely as happy escapes, they are curious and interesting. In the course of the femoral vessels, this phenomenon is particularly common. Through the axilla, through the neck, out and in behind the angles of the jaw, between the bones of the forearm and leg, balls of every size often take their passage without harm to the vessels. Take the following cases as examples: A soldier was wounded at Inkerman, by a ball which entered through the right cheek and escaped behind the angle of the left jaw, so tearing the parts that the great vessels were plainly visible in the wound. Three weeks after he was discharged without having had a bad symptom. A soldier of the Buffs was struck in June last, when in the trenches, by a rifle ball, in the nape of the neck. It passed forwards round the right side of the neck, up under the angle of the inferior maxilla, fractured the superior maxillary and malar bones, destroyed the eye, and, escaping, killed another man who was sitting beside him. This man made a recovery without a bad symptom.

A French soldier at the Alma was struck obliquely by a rifle ball, near, but external to the right nipple; the ball passed seemingly right through the vessels and nerves in the axilla, and escaped behind. His cure was rapid and uninterrupted. Endless numbers of similar cases may be seen in any military hospital.—*Ibid.*

18. *The Warm Bath in the Treatment of Wounds, Especially those made in Amputation.*—M. LANGENBECK, of Berlin, has published in the *Deutsche Klinik* for September 15th, 1855, an account of a process by which wounds, especially those made in amputation, can be constantly subjected to the influence of a warm bath. He first examines the modes of application of cold and warm water, and concludes that, in many cases, these are insufficient. He relates the advantages which he has obtained from the use of large warm baths after capital operation, such as disarticulation of the shoulder-joint, excision of the scapula, lithotomy, etc. These baths have been employed from half an hour to an hour once or twice daily, not being contraindicated by traumatic fever and inflammation of the edges of the wound; at a temperature of 97° Fahrenheit, they maintain warmth, diminish fever, heat, and the frequency of the pulse, calm pain, and keep the wound clear. Topical warm baths have often been

employed by MM. Langenbeck and Stromeyer, in gunshot wounds of the extremities, with or without injury of the bones, before and during suppuration. Stromeyer first recommended the use of the permanent warm bath after the operation for vesico-vaginal fistula.

The following is a description of the apparatus employed by M. Langenbeck:—

The apparatus intended for the upper extremities consists of two oblong basins, of various sizes; they are placed in a hollow of the mattress near the edge of the bed, so that, as the patient lies on his back, the arm may rest comfortably in them. The reservoir for the leg is triangular; the base is directed upwards, and the apex is fixed on a board, and moves on a hinge. By means of a wooden structure, which works into the supporting board, and is fixed at the upper end, the latter can be raised or depressed at convenience. The whole apparatus forms a double inclined plane, on which the leg, bent at an angle of about 120°, rests in the water. The basin has a cover fastened down, with an opening at the upper part to admit the leg. The opening has a projecting border, on which is fixed one end of a sleeve of vulcanized caoutchouc, the other end embracing the thigh and leg; in this way, the evaporation and cooling of the water are prevented. In the interior of the reservoir, three straps are fixed to hooks, so as to sustain the limb; while two other straps pass over the limb and keep it in position. At the bottom of the bath is a short tube, with a stopcock, for removing the water. Two openings, with movable coverings, are made in the cover of the apparatus; one being for introducing water and the other for receiving the thermometer.

Injuries of the knee, and the stump after amputations of the thigh, require the horizontal position, and consequently another form of apparatus. This consists of a square zinc box, from half a yard to a yard in length, fourteen inches wide, and arranged internally in the same manner as the apparatus already described. For stumps, the wall which looks towards the thigh has a large hole, with a projecting border, to which, by means of an iron ring, a caoutchouc tube passes and embraces the thigh. For injuries of the knee, the India-rubber tube is first applied to the thigh; then the leg is passed through the openings in the box and the lower caoutchouc tube; the lower border of the tube fixed on the thigh is then fastened by an iron ring, which is brought together by screws, to the projecting rim of the opening in the basin; and the apparatus, being thus adjusted, is filled with water.

M. Langenbeck, as a rule, leaves large wounds without dressings. But when they are the result of recent operations, attended with loss of substance, he applies charpie and a bandage to obviate secondary hemorrhage. These applications, however, are removed the next day, without disturbing the limb. In amputations, resections, etc., sutures are employed, an aperture being left at one corner of the wound for the escape of secretions.

In general it is best not to employ the apparatus until the risk of secondary hemorrhage has ceased; for instance, in amputation, not within eighteen or twenty-four hours. In several cases, however, M. Langenbeck has applied the bath immediately after operation, before the patient had recovered from the effects of chloroform. This proceeding has the advantage of not being troubled by dressings, and the pain in the wound is rendered very trifling. If consecutive hemorrhage arise, the limb must be removed from the apparatus.

Great attention must be paid to the caoutchouc bands, so that they may neither compress the limb too tightly, nor allow the escape of water. Notwithstanding these precautions, œdema and gangrene may be produced, even by the slightest constriction, in some cases; especially over such parts as the crest of the tibia, where the bone is immediately under the skin. These inconveniences may possibly be removed by further improvements; but it is well to examine the wounds carefully twice a day, when the water is renewed, and to shift the position of the caoutchouc sleeves, which should be sufficiently long.

The temperature of the water must vary according to the indications, whether it be desired to relieve pain, to prevent consecutive hemorrhage or inflammation, or to favour granulation. Further observations will probably point out the modifications required by the kind of lesion, and by the strength, age, and

temperament of the patient. When the apparatus is used immediately after operation, the temperature employed at first is from 50° to 55° Fahrenheit; if the water be not renewed, the temperature rises, in from three to twelve hours, up to 59°, 68°, or 88°. After the first day, this temperature is the most agreeable to the patient; at a later period when the wound begins to suppurate, water at 93° or 95° is used. In general, the feelings of the patient are the best guide on this point. It is easy to keep the temperature almost constant, by covering the apparatus more or less, and by adding warm or cold water. In summer, at a temperature of from 72° to 77° in the room, the heat of the bath rose, in twelve hours, from 93° to 95° or 100°. On the other hand, in winter, the temperature of the room being 63.5°, the water fell nearly constantly to 86° or 88° in the same period.

In general, it is sufficient to renew the water twice a day. If there be a large wound, or abundant suppuration, the apparatus must be carefully cleaned every day, by drawing off the water, and wiping the walls of the bath with sponges dipped in a chlorinated solution, taking care not to disturb the wound. When, however, the wound is large and not dependent, it is advisable to pass a stream of water into it to remove the secretions.

The advantages of this procedure are thus pointed out by M. Langenbeck:—

1. *Diminution of the Pain following Operation.*—However large the wound may be, pain is not complained of. In two cases, after injuries of the extremities, pain was produced in the sound foot and hand which were placed in the water, probably by distension of the thick epidermis. This pain, however, soon disappeared. When the water is being changed, and the injured part is exposed to the air, a cold sensation is experienced, attended with pain, which is removed as soon as the water is again poured in. If the wound remains exposed for a quarter of an hour, rigors are produced. M. Langenbeck has never seen rigors follow important operations, when the patient has been placed in a bath during anæsthesia.

By the use of the bath, the necessity for bandages, plaster, etc., is removed. The sutures can be removed without disturbing the limb, and cleanliness is maintained. Unfortunately, in amputation of the thigh, the apparatus is likely to produce œdema. This objection, however, may be removed by further improvement.

2. *Diminution of Fever.*—The traumatic fever, and that attending suppuration, lose their intensity. The pulse is usually from 88 to 90; at first, it is commonly as high as 120, but sinks as soon as suppuration commences. When the water is removed, the pulsation increases from 10 to 24, and again decreases when the water is added. If there be violent inflammation of the wound, or phlegmon of cellular tissue, the pulse may rise to 120 or 150, with corresponding general heat. During suppuration, Langenbeck once only observed rigors, indicating the formation of a large purulent deposit.

3. *Removal of the Secretions.*—So long as the water has free access to the wound, the stagnation and decomposition of its secretions are impossible, in proportion to the fluidity of these, and the dependent position of the limb. In deep and sinuous wounds, as after resection of the knee-joint, injections must be used. Complicated wounds, as those attending fracture of the thigh, with injury of the knee-joint, must be carefully watched; for, even though the surface of the wound be clean, there may be deposits in the subcutaneous cellular tissue, and when the wound is small, or when phlegmonous inflammation has set in. Incisions must then be employed, as in the ordinary treatment.

4. *Promotion of the Healing Process.*—M. Langenbeck has not yet been able to determine how far the use of the bath promotes union by the first intention. In one case, however, of circular amputation of the leg immediately below the knee, the wound healed by the first intention in the course of the sutures. In an open wound, subjected to the influence of the bath, the layers of coagulated blood, adherent to the wound, lose their colour; the fibrin remains, until, on the third or fourth day, it is removed by the granulations. The surface of the wound, in five or eight hours after operation, assumes a yellowish-gray colour, somewhat white, resulting from the decoloration of the superficial parts, and from the layer of exudation, which adheres to the wound. The limb, especially

in the vicinity of the wound, swells from the imbibition of water, and regains its natural dimensions on the removal of the water. This absorption must have a beneficial influence in promoting removal of the secretions, and preventing disorders in the capillary circulation. M. Langenbeck has observed inflammation of the edges of the wound and phlegmonous redness only in cases where purulent deposits were formed, or where the sutures were too tight.

In three or four days, the dead layer is removed in portions by the water, and granulation commences. In a very short time, the deeper parts become filled up, the ends of the bones are covered, and the granulations from the medullary canal unite with the others. In the bath, the granulations attain a development, which is not observed with other modes of dressing. Their semi-transparent appearance shows that this depends in part on the absorption of the water. When the wound is covered with granulations, cicatrization commences. This is probably somewhat retarded by the bath; hence at this stage M. Langenbeck has recourse to the ordinary dressings.

To ascertain whether wounds heal more rapidly under water than when exposed to air, a large number of comparative experiments would be required; and even then we must remember that the period of healing varies even for the same operation. In three cases of subcutaneous resection of the tibia and fibula, healing took place in five, seven, and twelve weeks; while in two cases of subcutaneous excision of ankylosed elbow-joints, the wounds healed in the water bath in four weeks. A case of excision of the knee-joint, performed at Kiel, required fourteen weeks; while another case, under the influence of the bath, required only eight weeks. It must be remembered, however, that operation wounds sometimes heal very rapidly under the ordinary treatment. Nevertheless, M. Langenbeck is inclined to believe that the use of the bath promotes cicatrization.

Will the employment of the bath obviate the danger of pyæmia? This question cannot yet be decidedly answered; but M. Langenbeck has never seen pyæmia attend this treatment, although it occurred at the same time in other patients under his care. Chilling of the wound, retention and decomposition of the secretions, and miasmata, are the causes of pyæmia. These are obviated by the use of the bath; although the possibility of the occurrence of pyæmia cannot be denied.

M. Langenbeck relates several cases in which he has employed the treatment described, viz:—

1. Compound comminuted fracture of the right leg: 2. Osteosarcoma of the right tibia; amputation immediately below the knee: 3. Carcinoma of the foot; amputation by Lisfranc's method: 4 and 5. Ankylosis of the right elbow; subcutaneous resection: 6. Medullary cancer of the patella; removal of the patella, and excision of the ends of the bones: 7. Large fibrous tumour on the outer side of the knee; extirpation; joint opened; extensive gangrene and sanious suppuration. Recovery took place in all the cases except the last.

In the *Deutsche Klinik* for October 13, 1855, Dr. Fock publishes some further observations. The following are the cases in which the use of the bath is indicated: 1. All large wounds of the soft parts, whether it be desired to heal them by the first intention or not. 2. Penetrating wounds of the joints. 3. Compound fractures, as soon as inflammation and suppuration of the skin and cellular tissue set in. 4. Lacerations of the soft parts of the hands and feet, with or without injury of the bones. 5. After lithotomy, urethrotomy, operation for hernia, removal of uterine tumours, extirpation of the ovary. 6. Caries. 7. Whitlow, diffuse phlegmon, and acute suppurative oedema. 8. Gangrene. 9. Burns. 10. Acute and chronic inflammation of the joints. 11. Operations for ankylosis and contracted joints, whether by rupture or osteology. [12. The Cæsarean section?]—*Association Med. Journ.*, March 8, 1856.

19. *Surgical Uses of Glycerine*.—In our preceding No. (p. 518), we noticed some observations made by M. Demarquay on the surgical applications of glycerine. Since M. Demarquay published his remarks, further experiments have been made on the subject, the result of which has been published (*Gazette*